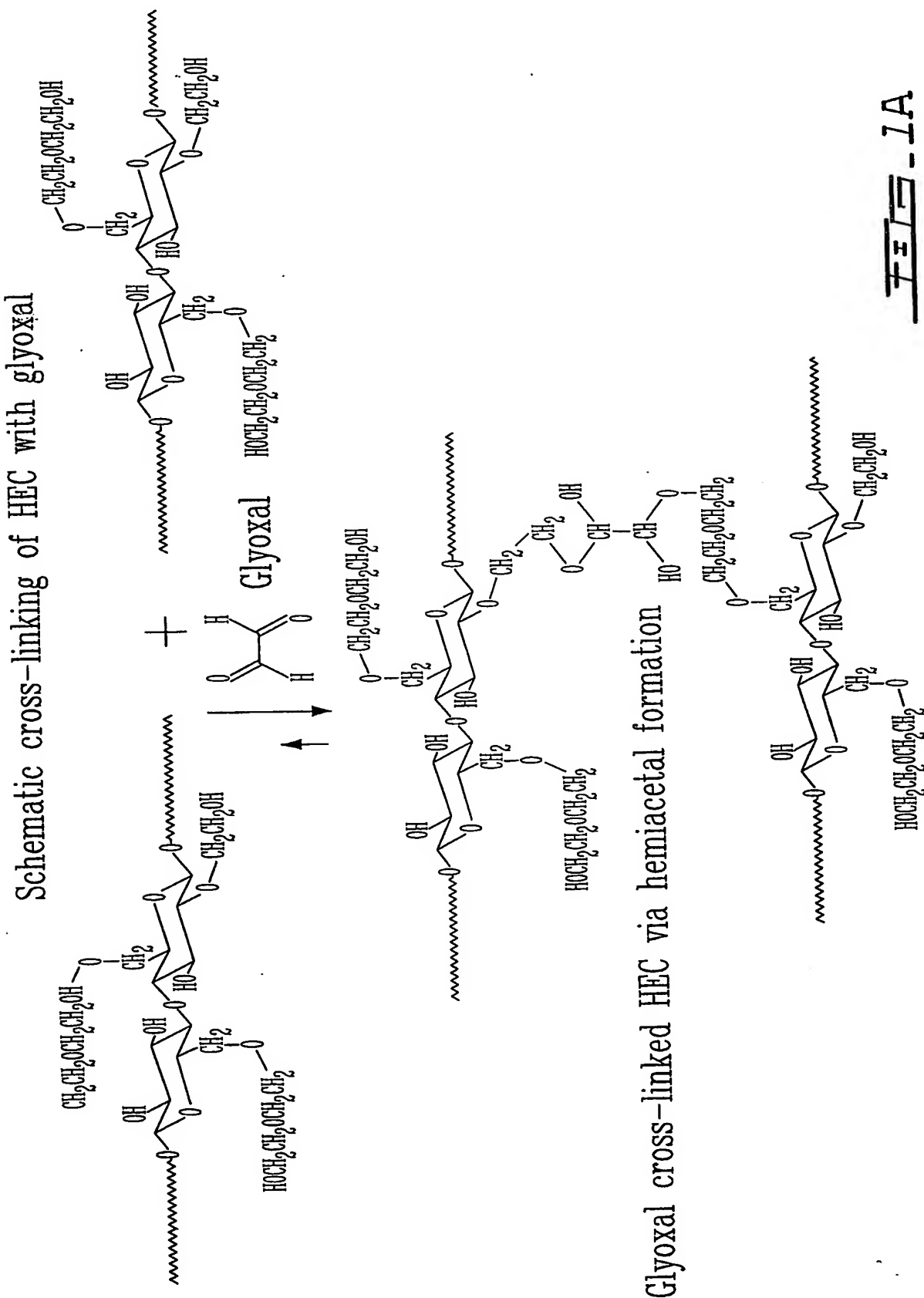
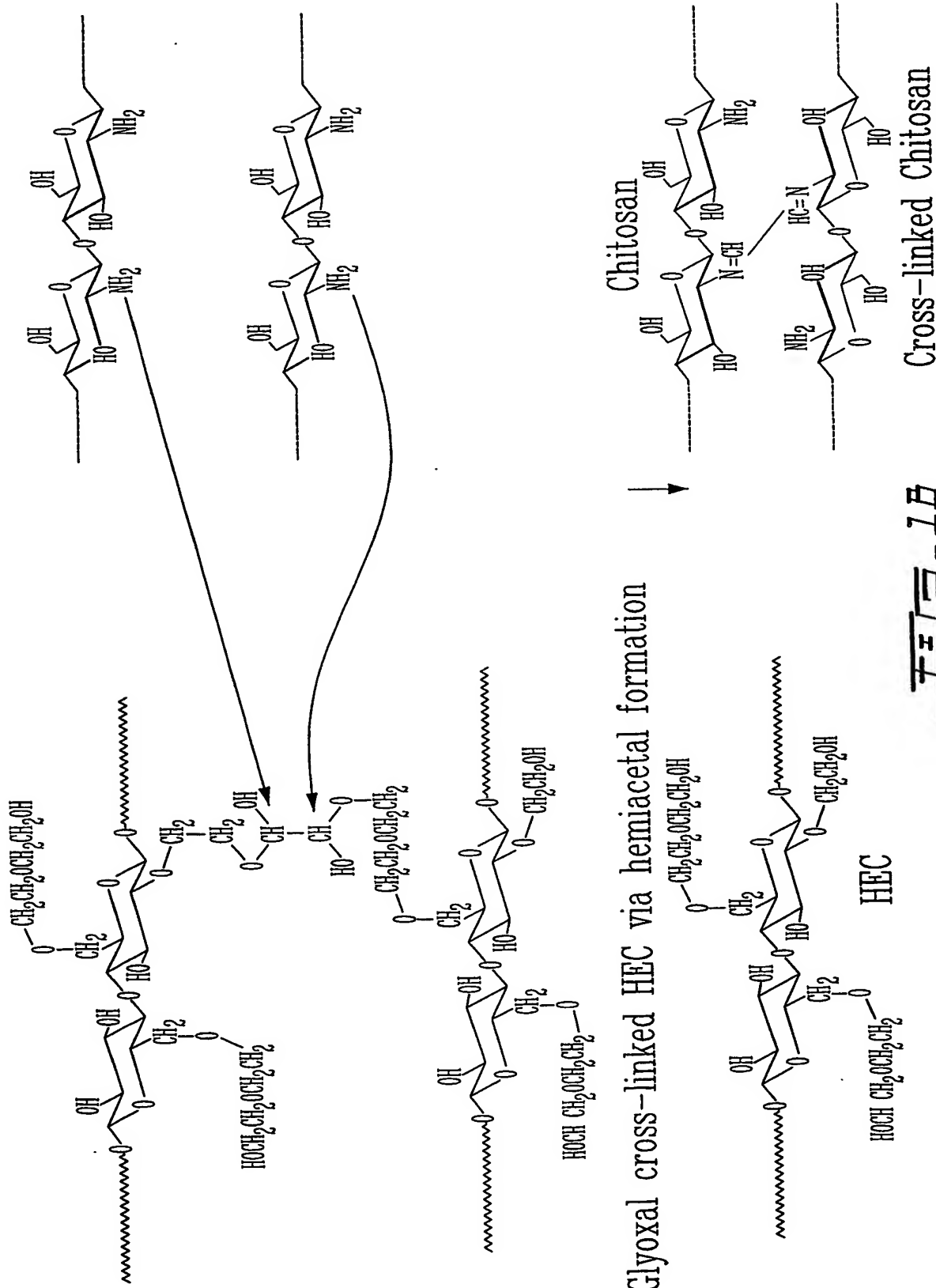


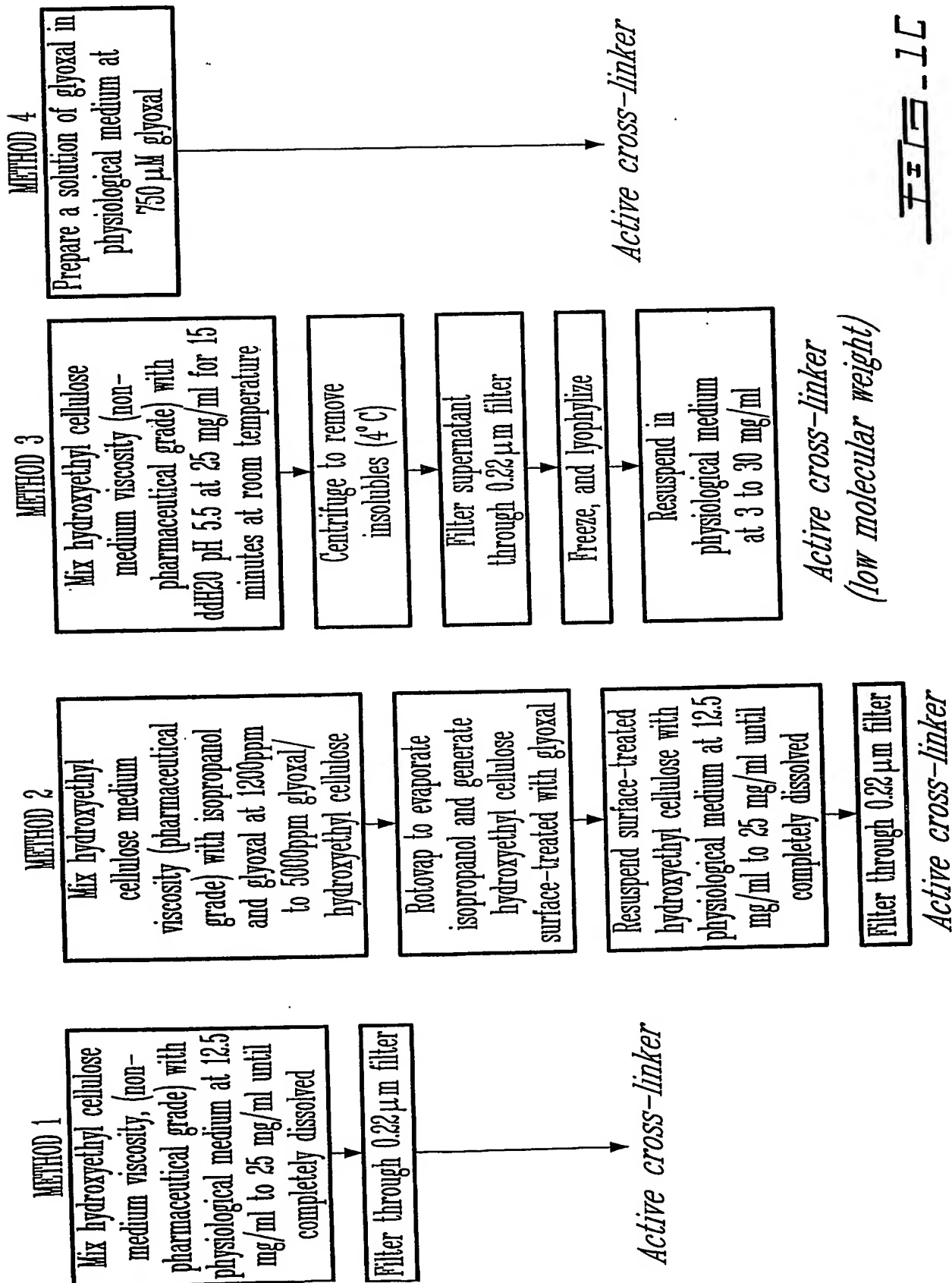
1 / 18



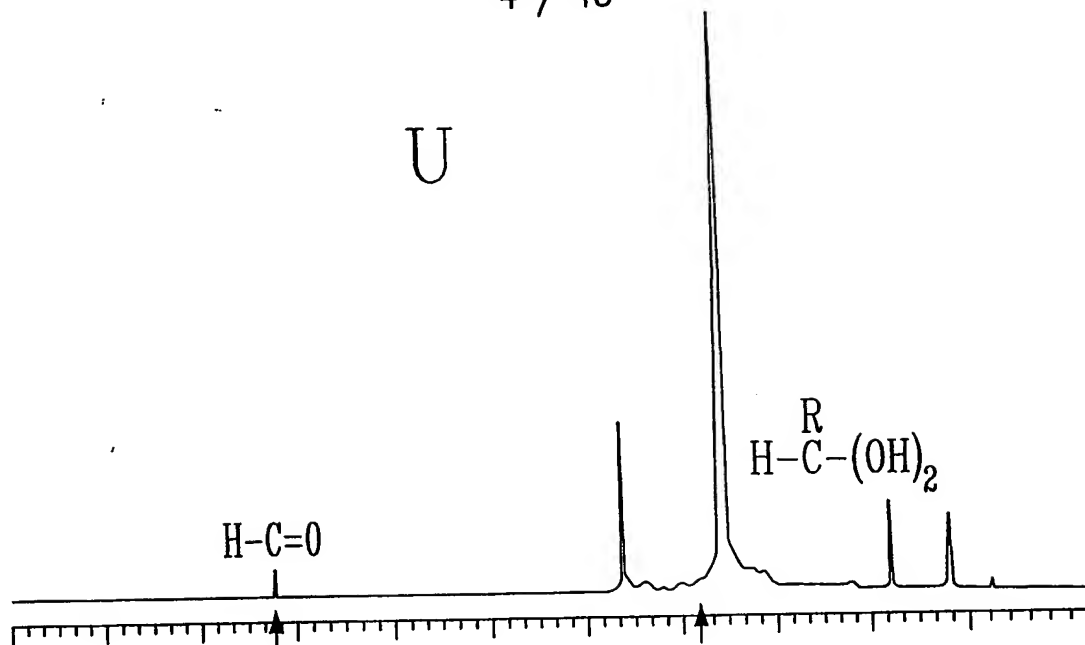
2 / 18



3 / 18

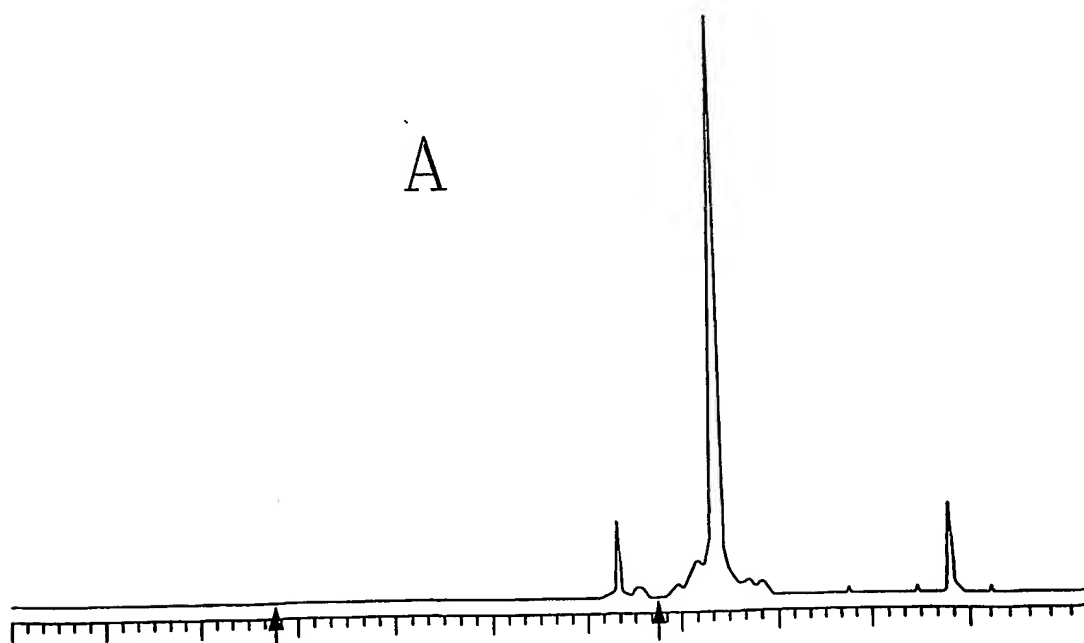


4 / 18



U: Unfractionated HEC = active

FIG. 2A



A: HEC: Above 1000 Da = inactive

FIG. 2B

5 / 18

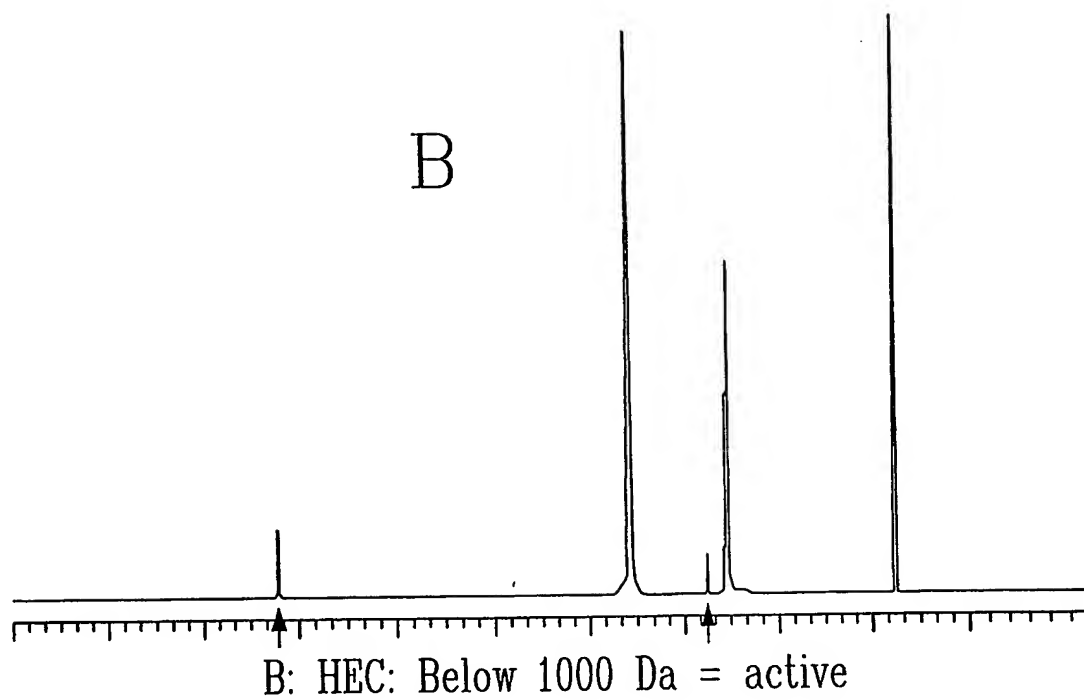


FIG. 2C

6/18

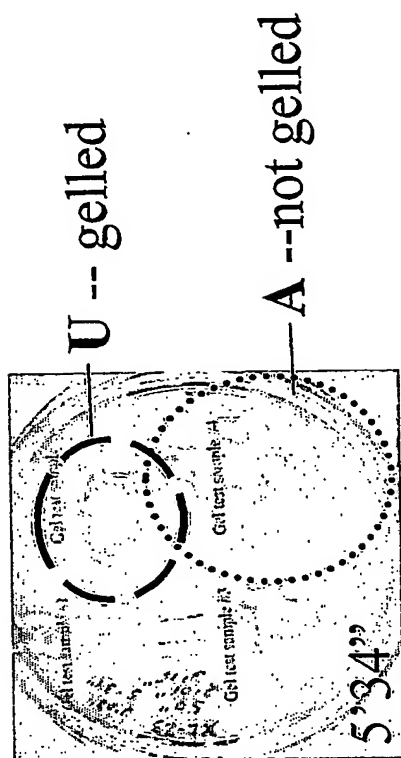


FIG. 2E

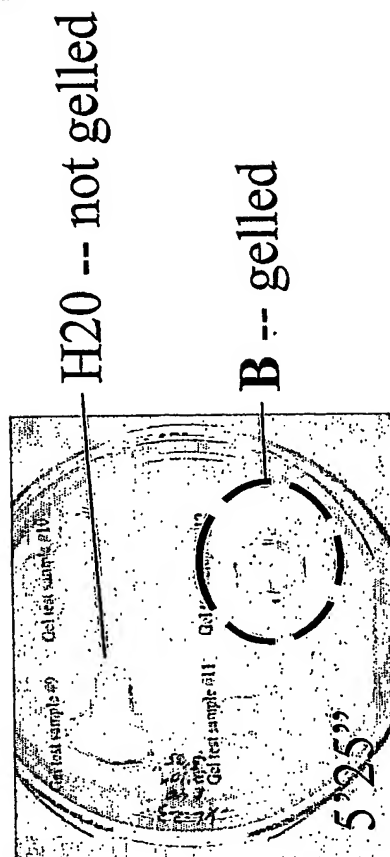


FIG. 2G

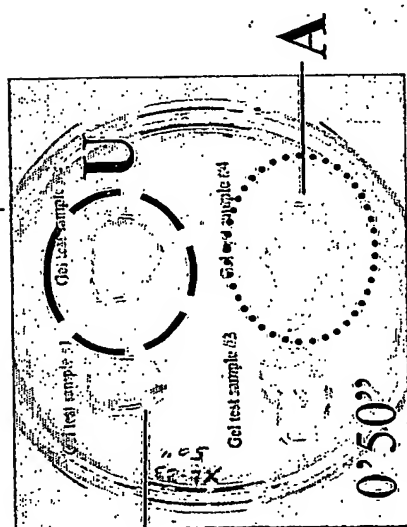


FIG. 2D

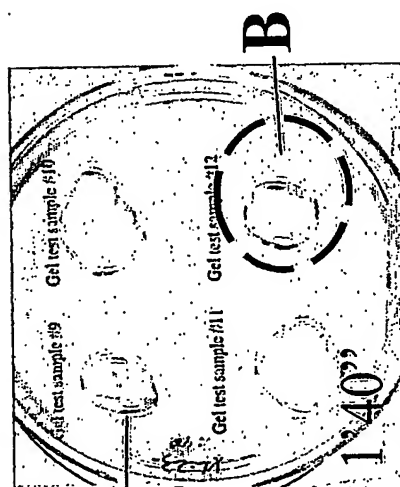


FIG. 2F

7 / 18

CHITOSAN: HEC/aldehyde GEL TIME

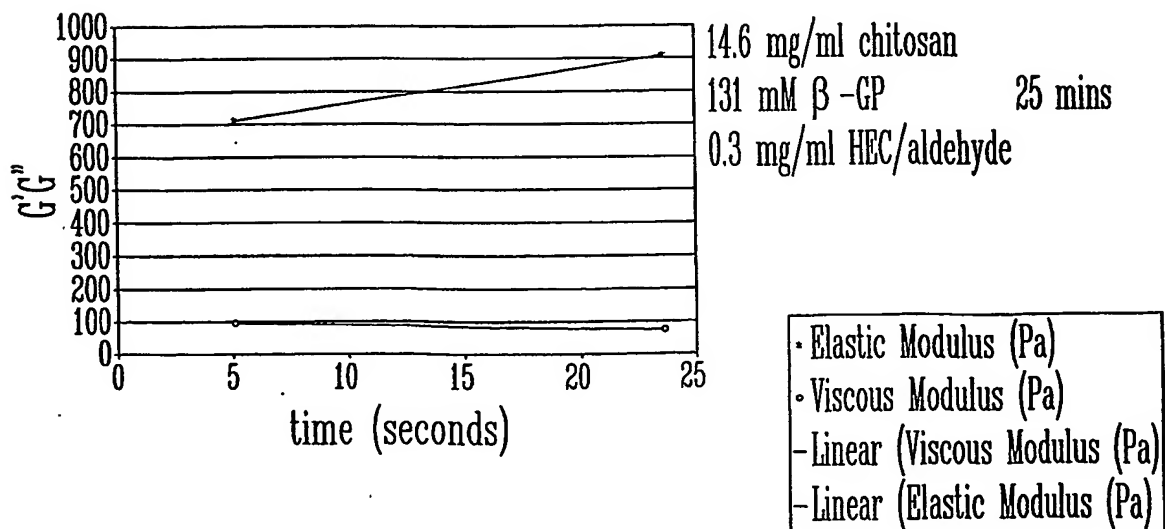
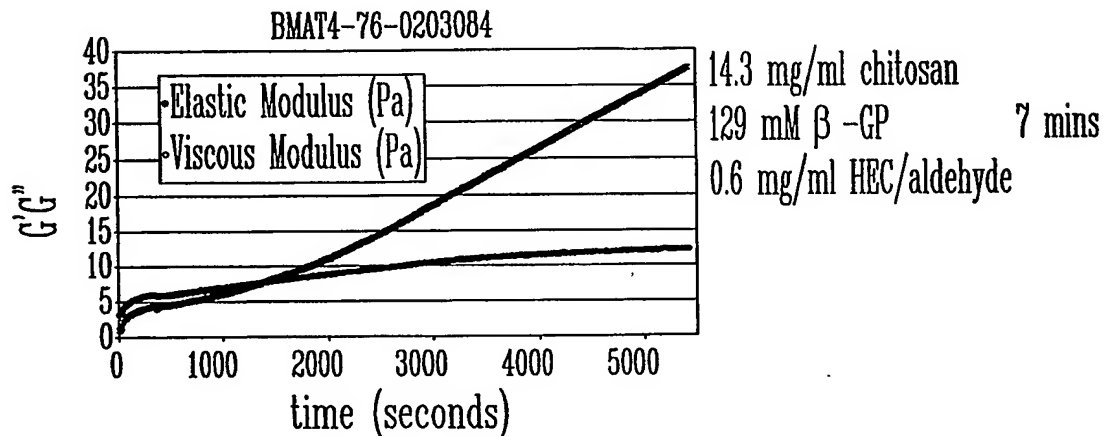
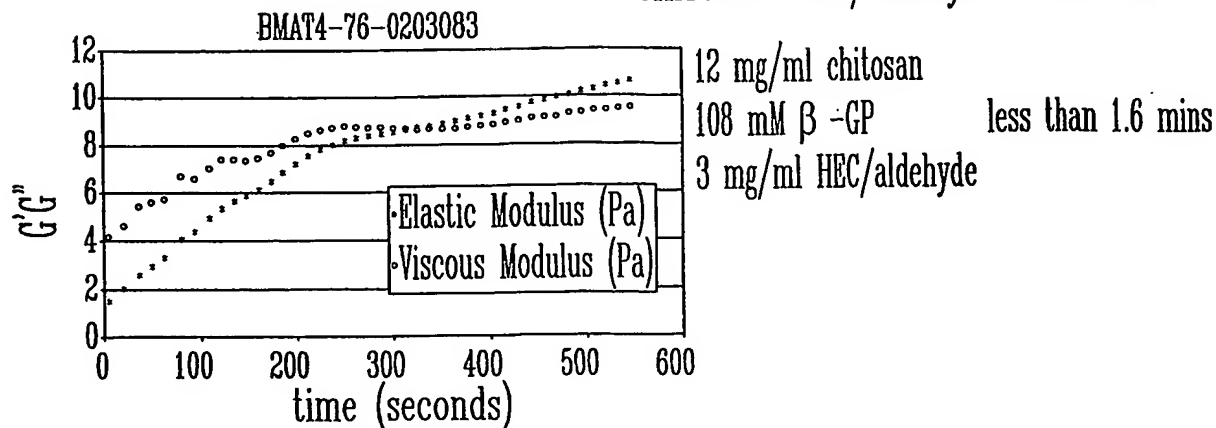


FIG. 3

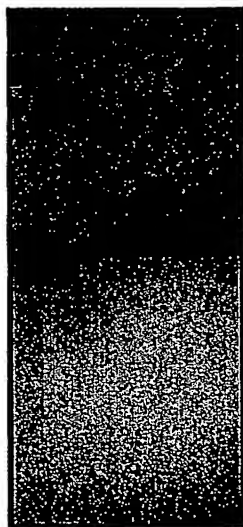
8/18

PASSAGED BOVINE CHONDROCYTES
CULTURED IN CROSS-LINKER SOLUTION
2 HOURS CULTURE 72 HOURS CULTURE
LIVE (green) DEAD (red) LIVE (green))

FIG. 4A

1 DAY POST-
ENCAPSULATION
VIABLE CELLS

0.3% H₂O₂
(negative
control)



1.3 mM
glyoxal
(METHOD 4)



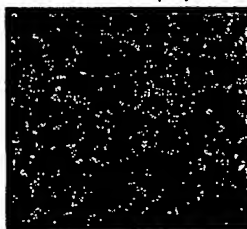
HEC-glyoxal
(METHOD 2)



HEC-glyoxal
(METHOD 1)



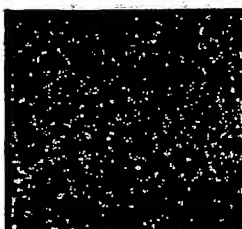
750 μ M
[glyoxal]



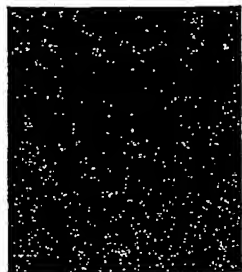
IMMEDIATE
POST-
ENCAPSULATION
VIABLE CELLS

extruded through
a 26g needle

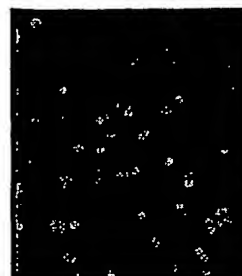
25 mg/ml
[HEC]



5 mg/ml
[HEC]_{final}



150 μ M
[glyoxal]_{final}



9 / 18

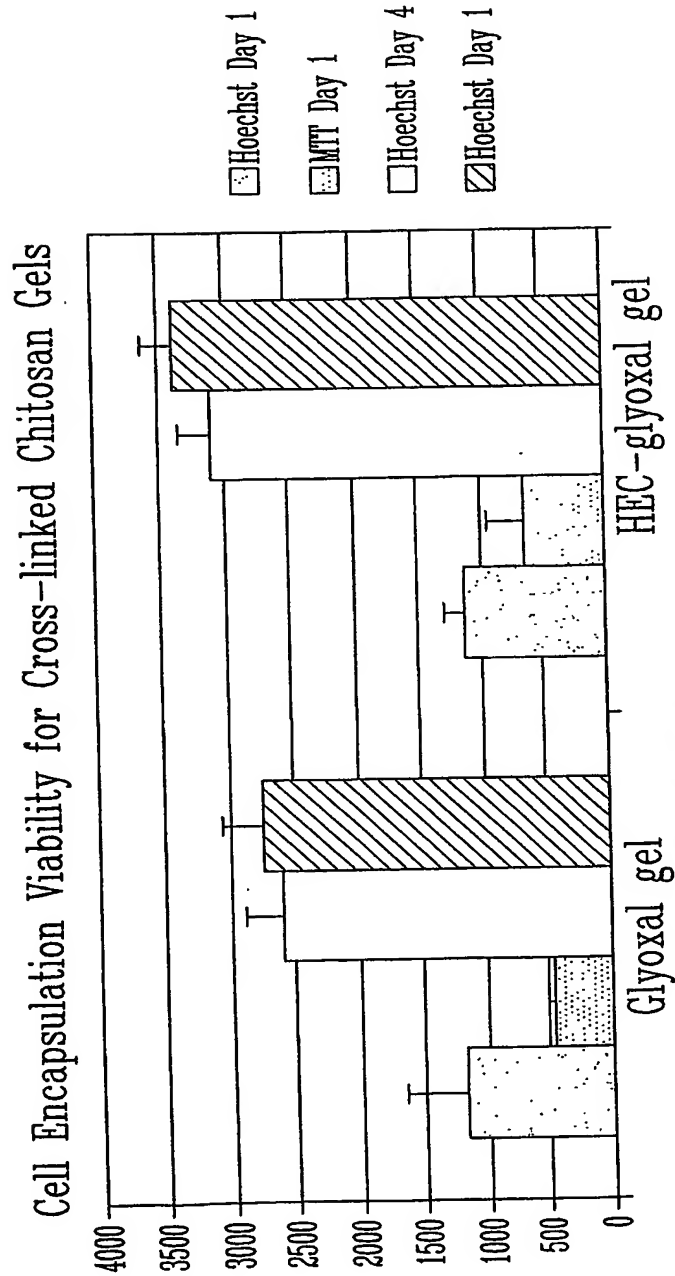


FIG. 4B

10/18

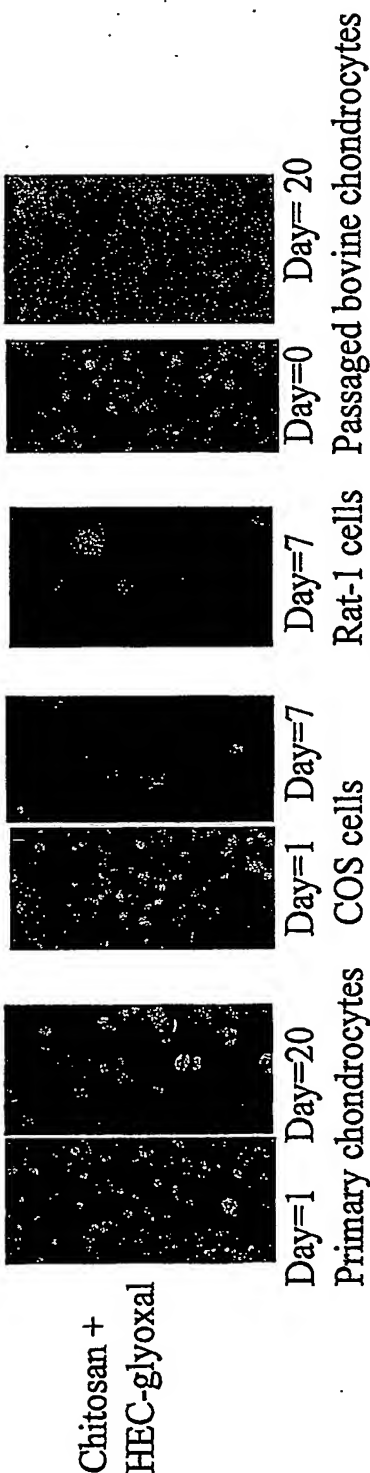


Fig. 5A

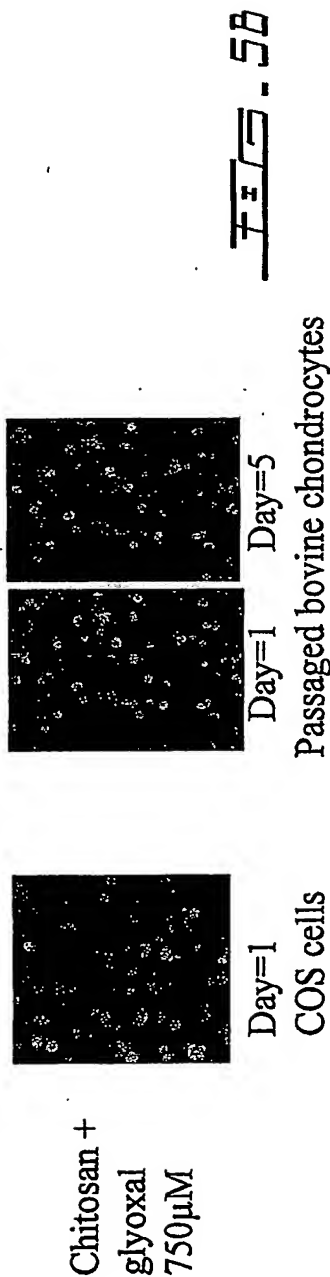


Fig. 5B

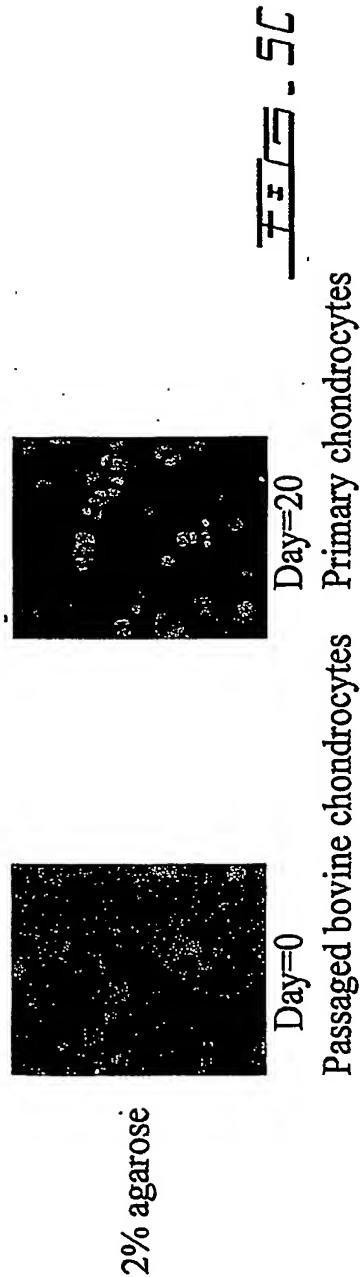


Fig. 5C

11/18

5

Composition of final gel

	% (w/v)	Mol/L	Final pH (room temp) pH 6.85
Protasan UP CL 213 starting pH 5.5	1.35	0.08	
NaOH		0.018	
Glucosamine	0.38	0.018	
Disodium beta - GP	2.06	0.104	
METHOD 1 Fluka Hydroxyethyl cellulose- glyoxal 25 mg/ml original concentration	0.4 (~0.001% glyoxal)	(~ 150µM glyoxal)	

Composition of final gel

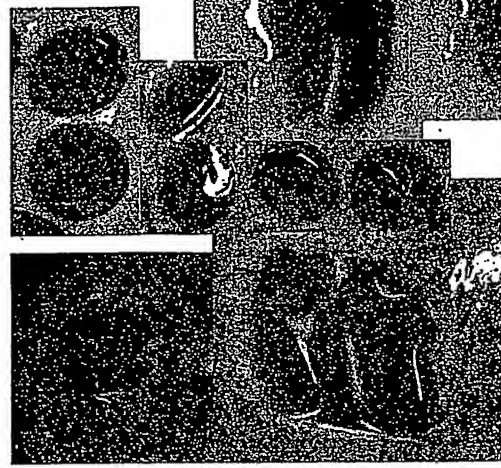
	% (w/v)	Mol/L	Final pH (room temp) pH 6.75
Chitosan 83%DDA in 67 mM HCl starting pH 4.5	1.2	0.073	
Disodium beta - GP	2.4	0.113	
METHOD 2 Hydroxyethyl cellulose-2500 ppm glyoxal, 25 mg/ml original concentration	0.4 (~0.001% glyoxal)	(~ 150µM glyoxal)	

Composition of final gel

	% (w/v)	Mol/L	Final pH (room temp) pH 6.75
Chitosan 83%DDA in 67 mM HCl starting pH 4.5	1.2	0.073	
Disodium beta - GP	2.4	0.113	
METHOD 4 glyoxal 750µM original concentration	~0.001%	~ 150µM	

12/18

Full thickness

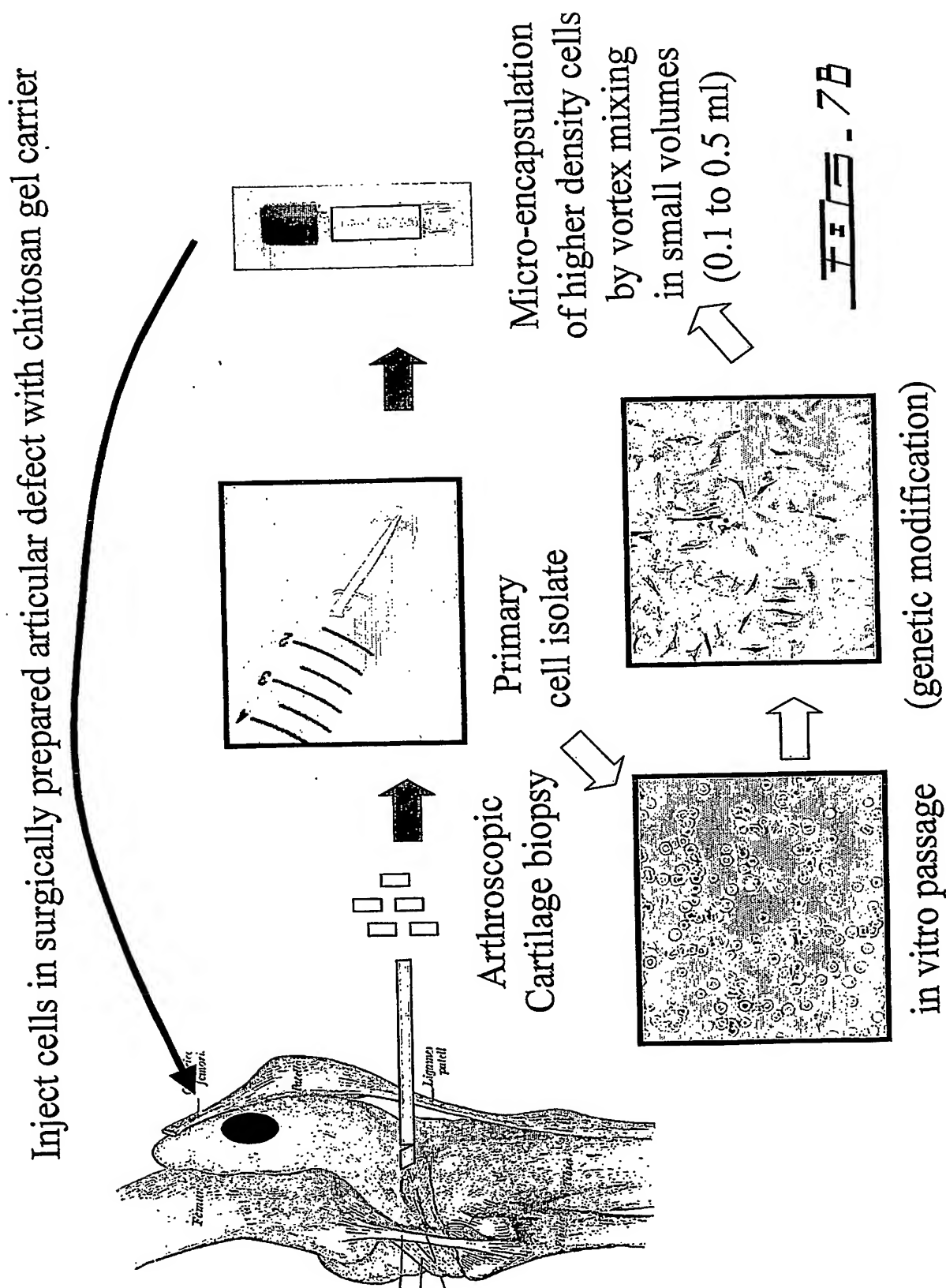


Partial thickness

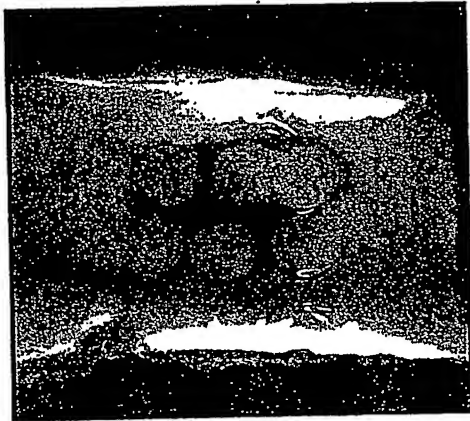


FIL-7A

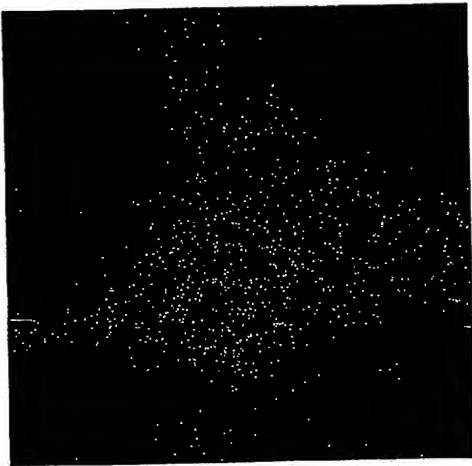
13/18



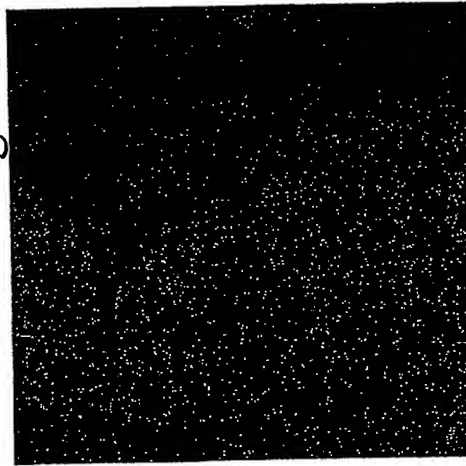
14/18



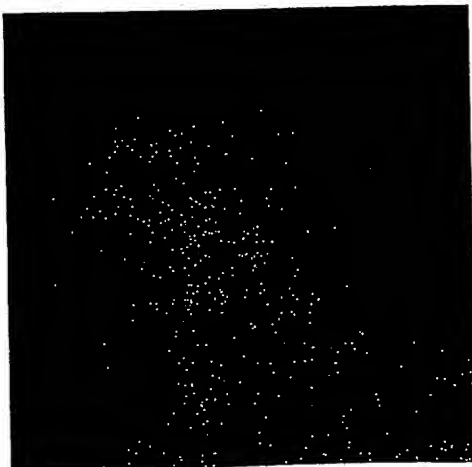
Prepared treated
porcine defect
(Hoechst-stained blue
chondrocytes) loaded
with cross-linked
chitosan delivering live
(Calcein AM stained
green) primary
chondrocytes



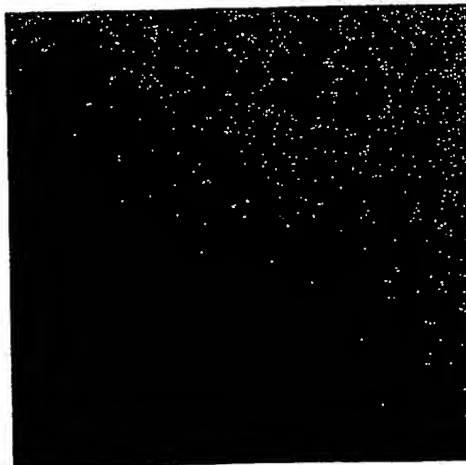
4x mag



20x mag



4x mag

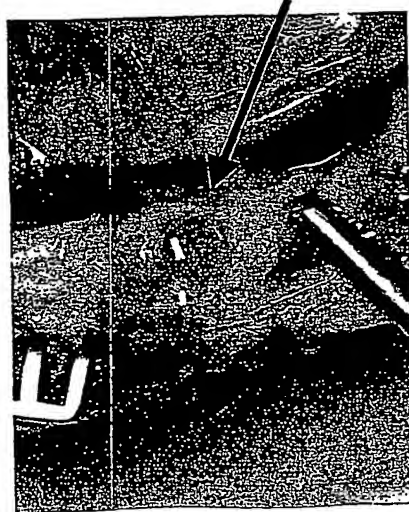


40x mag

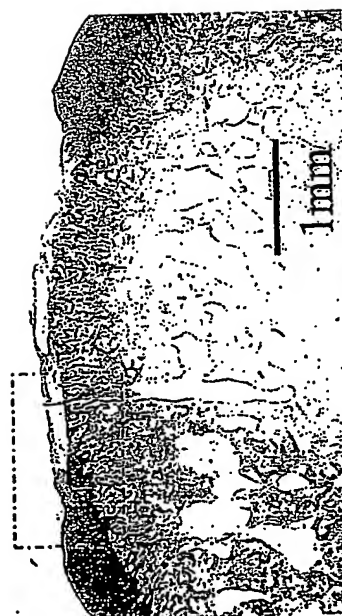
Fig. 7C

15/18

Surgical implant of
cross-linked chitosan
in
patella and
femoral-patellar groove



chitosan gel



Patellar Implant after 1 day in vivo FEI-BA

16/18

no implant

Cross-linked chitosan implant



blood clot

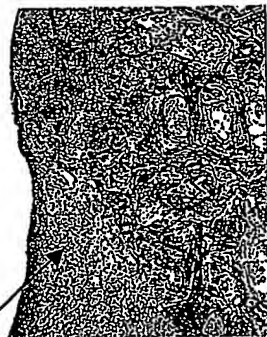
Day 1

chitosan gel

Figs. 8B

20x

blood clot



chitosan gel

Day 7

10x



New woven bone

2.5X



chitosan gel

Day 32

2.5x

17/18

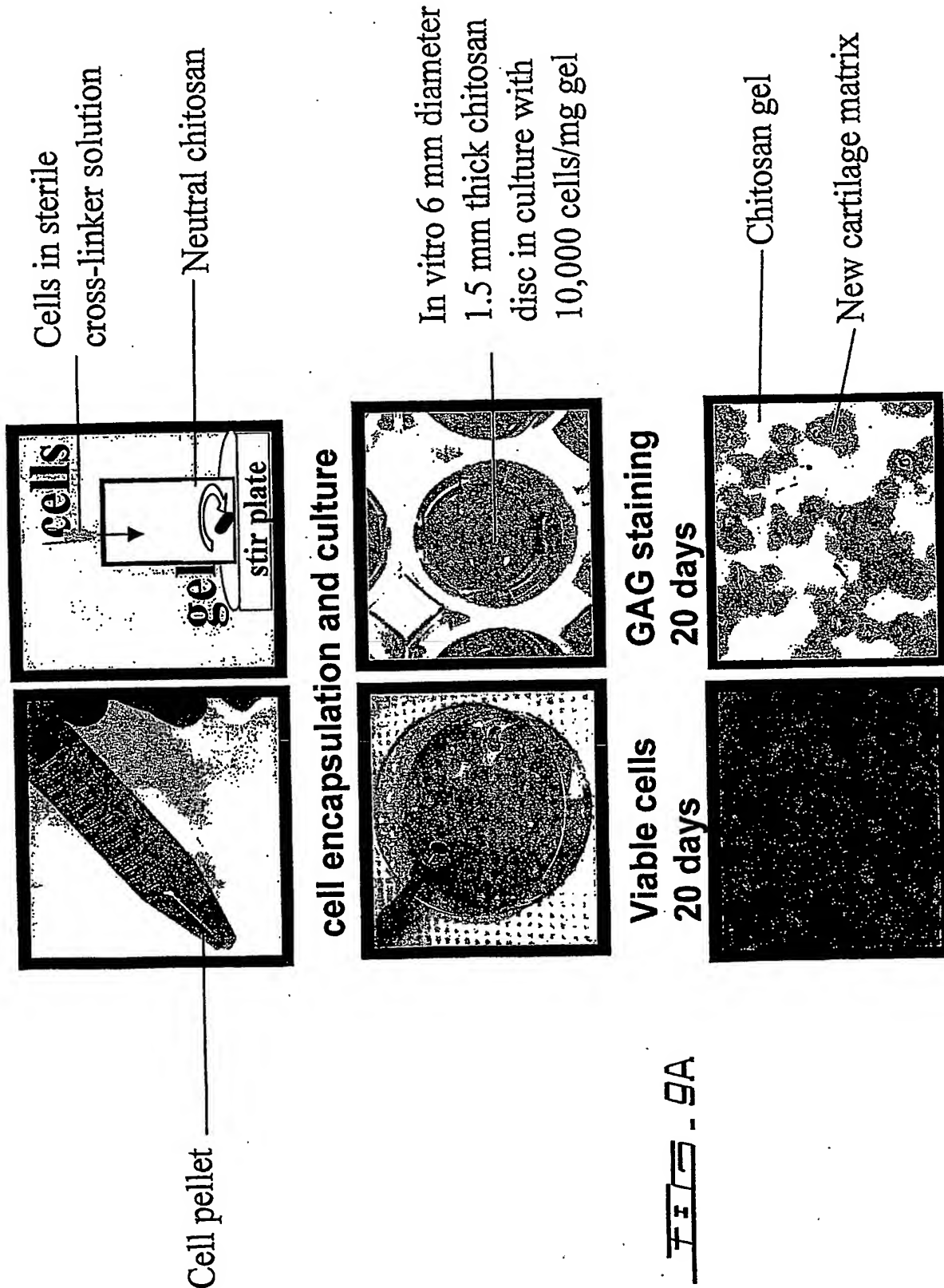
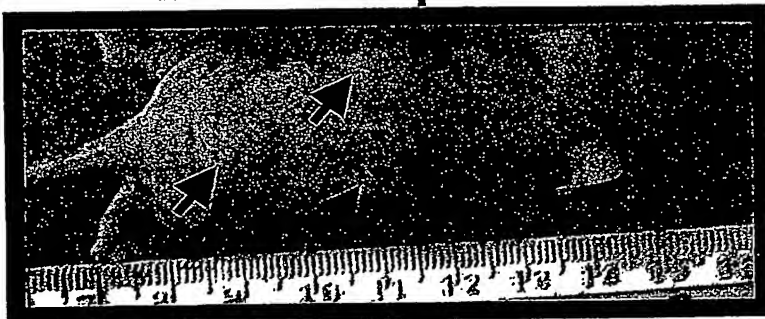


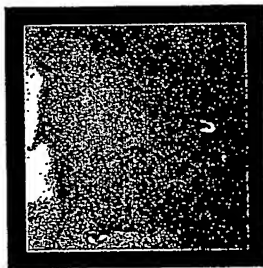
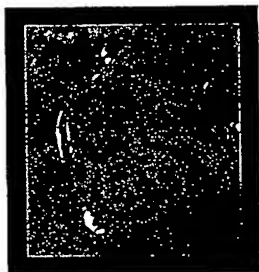
FIG. 9A

18/18

In Vivo implants



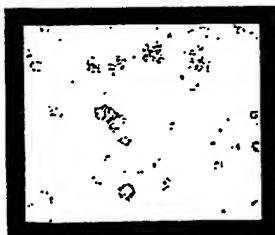
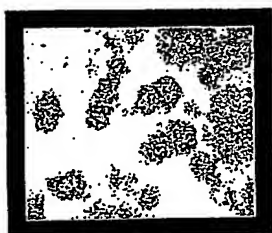
Dissected implants with chondrocytes



GAG staining

48 days

63 days



FIS - 9B